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|-------------------------------|------------------------|---------------------|--|
| Notice of Allowability | Application No. | Applicant(s) | |
| | 10/676,921 | LOWELL ET AL. | |
| | Examiner | Art Unit | |
| | MengYao Zhe | 2195 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. This communication is responsive to 12/18/2007.
2. The allowed claim(s) is/are 1-5, 7-13, 15-20, 22-25, 27-30, 32-34, 36-38, 40-42, 44-45; renumbered as 1-37.
3. Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All
 - b) Some* c) None of the:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____

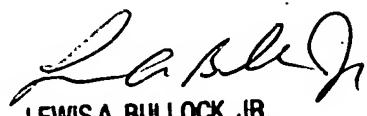
Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) hereto or 2) to Paper No./Mail Date _____
 - (b) including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. Notice of References Cited (PTO-892)
2. Notice of Draftperson's Patent Drawing Review (PTO-948)
3. Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____
4. Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. Notice of Informal Patent Application
6. Interview Summary (PTO-413),
Paper No./Mail Date 1/16/2007
7. Examiner's Amendment/Comment
8. Examiner's Statement of Reasons for Allowance
9. Other _____



LEWIS A. BULLOCK, JR.
PRIMARY EXAMINER

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to the applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Philip S. Lyren on 1/16/2008.

The application has been amended as follows:

Claim 1:

In a computer including hardware, a virtual machine monitor, and first and second operating system instances, a method comprising:

using the virtual machine monitor (VMM) to expose the first operating system instance to a first hardware partition of the hardware and prevent the first operating system instance from discovering a second hardware partition of the hardware;

using the virtual machine monitor to expose the second operating system instance to the second hardware partition and prevent the second operating system instance from discovering the first hardware partition; and

using the virtual machine monitor to share at least some of the hardware among the first and second operating system instances that are booted on the VMM after the hardware is configured, wherein the VMM configures the hardware so accesses to requested addresses by the first OS trap to the VMM. the traps occurring during resource discovery of memory installed and input/output (I/O) devices present by a booting operating system (OS) instance consisting one of the first or second OS instances, and the VMM responds to a trap by misinforming the booting OS instance about the existence of hardware not in its partition.

Claim 20:

In a computer including hardware, a virtual machine monitor running on the hardware, a method comprising:

booting a plurality of operating system (OS) instances on the virtual machine monitor (VMM);

using the virtual machine monitor to expose each of the booting operating system instances to its own partition and to prevent each of the operating system instances from discovering other hardware partitions; and

using the virtual machine monitor to share at least some of the hardware among the operating system instances;

wherein operation of the virtual machine monitor is transparent to the plurality of operating system instances, which are booted on the VMM after the hardware is configured, wherein the VMM configures the hardware so accesses to addresses requested by the any OS instance trap to the VMM, the traps occur during resource discovery of memory installed and input/output (I/O) devices present by the a booting OS instance, and the VMM responds to a trap by misinforming the booting OS instance about an existence of hardware not in its partition, and wherein the first and second instances are booted on the VMM after the hardware is configured.

Claim 29:

A computer comprising:

memory for storing a virtual machine monitor (VMM), a first operating system (OS) and a second OS;
a processor for running the VMM and first and second OS instances on the VMM;

the VMM designed to expose a first OS instance to a first hardware partition and prevent the first OS instance from discovering a second hardware partition;

the VMM designed to expose a second OS instance to the second hardware partition and prevent the second OS instance from discovering the first hardware partition;

the VMM designed to allow at least some hardware sharing among the first and second OS instances, which are booted on the VMM after the hardware is configured,

wherein the VMM configures hardware so accesses to requested addresses by the first OS trap to the VMM, the traps occur during resource discovery of memory installed and input/output (I/O) devices present by ~~the a~~ booting OS instance consisting one of the first or second OS instance, and the VMM responds to a trap by misinforming the booting OS instance about an existence of hardware not in its partition ~~and wherein the first and second instances are booted on the VMM after the hardware is configured.~~

Claim 30:

A computer for running first and second operating system (OS) instances, the computer comprising hardware including memory, the memory encoded with a virtual machine monitor (VMM) for exposing the first OS instance to a first partition of the hardware and preventing the first OS instance from discovering a second partition of the hardware; exposing the second OS instance to the second hardware partition and preventing the second OS instance from discovering the first hardware partition; and sharing at least some of the hardware among the first and second OS instances that are booted on the VMM after the hardware is configured, wherein the VMM configures the hardware so accesses to requested addresses by the first OS trap to the VMM, the traps occur during resource discovery of memory installed and input/output (I/O) devices present by ~~the a~~ booting OS instance, consisting one of the first or second OS instance, and the VMM responds to a trap by misinforming the booting OS instance about an existence of the hardware not in its partition.

Claim 38:

An article for a computer, the article comprising computer memory encoded with a virtual machine monitor (VMM) for exposing a first operating system (OS) instance to a first hardware partition and preventing the first OS instance from discovering a second hardware partition; exposing a second OS instance to the second hardware partition and preventing the second OS instance from discovering the first hardware partition; and sharing at least some of the hardware among the first and second OS instances that are booted on the VMM after the hardware is configured, wherein the VMM configures the hardware so accesses to requested addresses by the first OS trap to the VMM, the traps occur during resource discovery of memory installed and input/output (I/O) devices present by the a booting OS instance, consisting one of the first or second OS instances, and the VMM responds to a trap by misinforming the booting OS instance about an existence of the hardware not in its partition.

3. Pursuant to MPEP 606.01, the title has been changed to read:

-- Resource Allocation and Protection in a Multi-virtual Environment--

REASONS FOR ALLOWANCE

4. The following is an examiner's statement of reasons for allowance:

All of the independent claims contain the detailed limitations of a booting operating system attempting to access specific parts of hardware that is not designated to it, in which case the virtual machine monitor responds by trapping the access to itself

during resource discovery. Then the virtual machine monitor misinforms the booting OS instance about the existence of the hardware that the OS is trying to access.

The cited prior art at best teaches portioning resources to virtual machines and disabling accesses among different partitions, and trapping these accesses to a virtual machine monitor in order to change resource allocation to a particular machine (Analysis of the Intel Pentium's Ability to Support a Secure Virtual Machine Monitor; Proceedings of the 9th USENIX Security Symposium; Section 1.3). None of the prior art of record details such trapping as occurring during resource discovery of memory installed and I/O devices present, nor did they teach misinforming the booting OS instance about the existence of hardware not in its partition. Therefore, the claims are allowable for at least those reasons.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

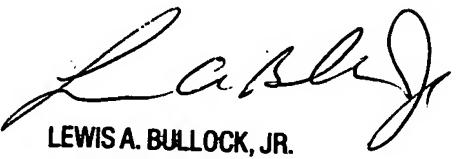
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MengYao Zhe whose telephone number is 571-272-6946. The examiner can normally be reached on Monday Through Friday, 7:30 - 5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on 571-272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

M.Z., 1/18/2008



LEWIS A. BULLOCK, JR.
PRIMARY EXAMINER